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Integrating sustainability into day-to-day business: a tactical management dashboard for O-LCA

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Institute of Applied Informatics and Formal Description Methods (AIFB)

Introduction

Context

- Organizational sustainability requires holistic perspective.
- Analyses produce complex, hard to interpret results.

Consequence

- What is not understood, is not addressed.
- Effective ways to present analyses are required.

Goal

Management Dashboard for the holistic consideration of corporate sustainability, which communicates sustainability information for decision makers in an easily understandable way.

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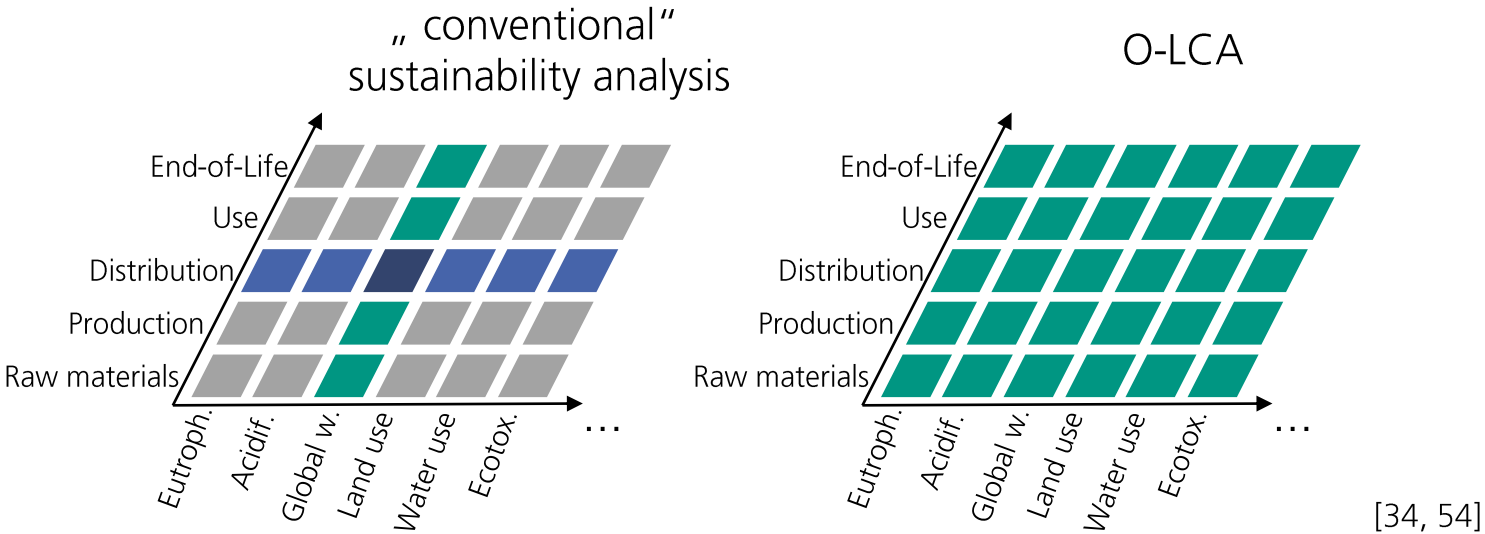
Organizational Life Cycle Assessment (O-LCA)

- Method to identify and qualify sustainability impacts
- Advantage: Life-cycle perspective and multi-impact analysis



[34, 54]

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O-LCA Procedure

- Definition of study goal
- Definition of scope
  - Reporting org.
  - Reporting flow
  - System boundaries

- Data collection
- System Modeling
- Inventory calculation

- Definition of Impact Categories
- Classification and characterization of inventory
- Calculation of impact indicators

- Draw conclusions
- Assess result quality
- Identify hotspots

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Dashboard Design

Dashboard:
Performance-Management-Tool, that summarizes and visualizes data and presents the most important information on a single screen

	Strategic	Tactical	Operational
Functio-nality	Management of People and Processes	Causal analysis and exploration of information	Monitoring of critical processes and activities
Users	Executives, managers, employees	Managers, analysts	Supervisors, specialists
Informa-tion	Summarized / weakly detailed	Summarized / detailed	Detailed
Updates	Monthly / quarterly	Daily / weekly	Hourly / daily
Design Elements	Simple presentation Widespread publication Comparison to plan Commentable and collaborative Inclusion of recommendations	Interactive Structured and guided Detailed Contextualized Support of advanced analytics	Clear and simple presentation Selective and efficient Highlighting of exceptions Customizable

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[6, 8, 24, 50]

Requirements

- **O1** Display of the organization's current sustainability indicators as well as its objectives.
- **O2** Aggregation and display of the sustainability indicator hierarchy.
- **O3** Display of the scope of the analysis, i.e. the covered processes and activities of the organization.

- **D1** Inclusion of interactive features.
- **D2** Implementation of a structured and guided display.
- **D3** Inclusion of detailed information.
- **D4** Implementation of contextualization in the display.

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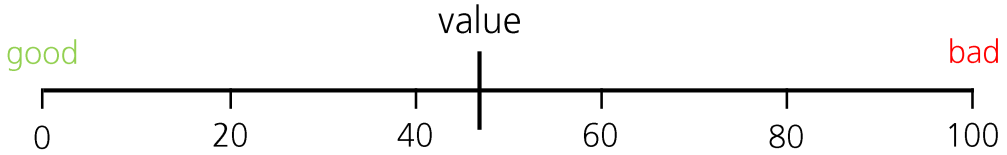
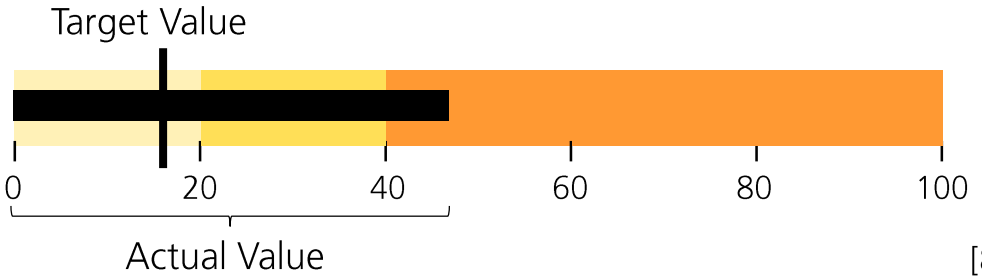
O1: Indicator Display

- Value normalized on a scale from 0 to 100:



- Representation of actual value and target value in bullet graph:



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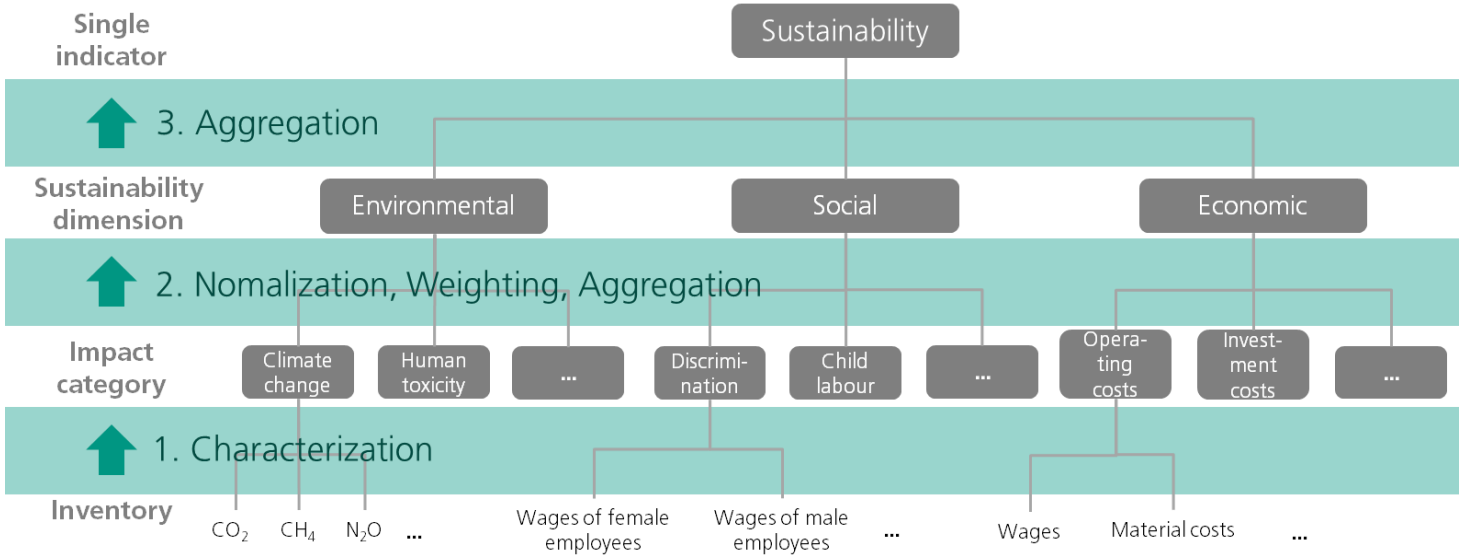
O2: Aggregation Scheme



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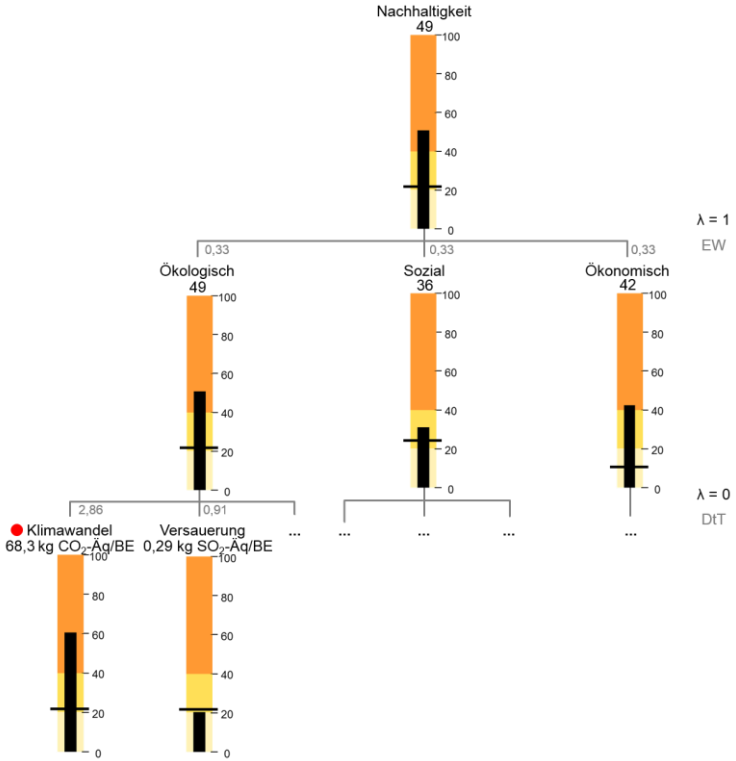
For more details: https://git.scc.kit.edu/von-bis-public/o-lca-dashboard

O2: Indicator Hierarchy



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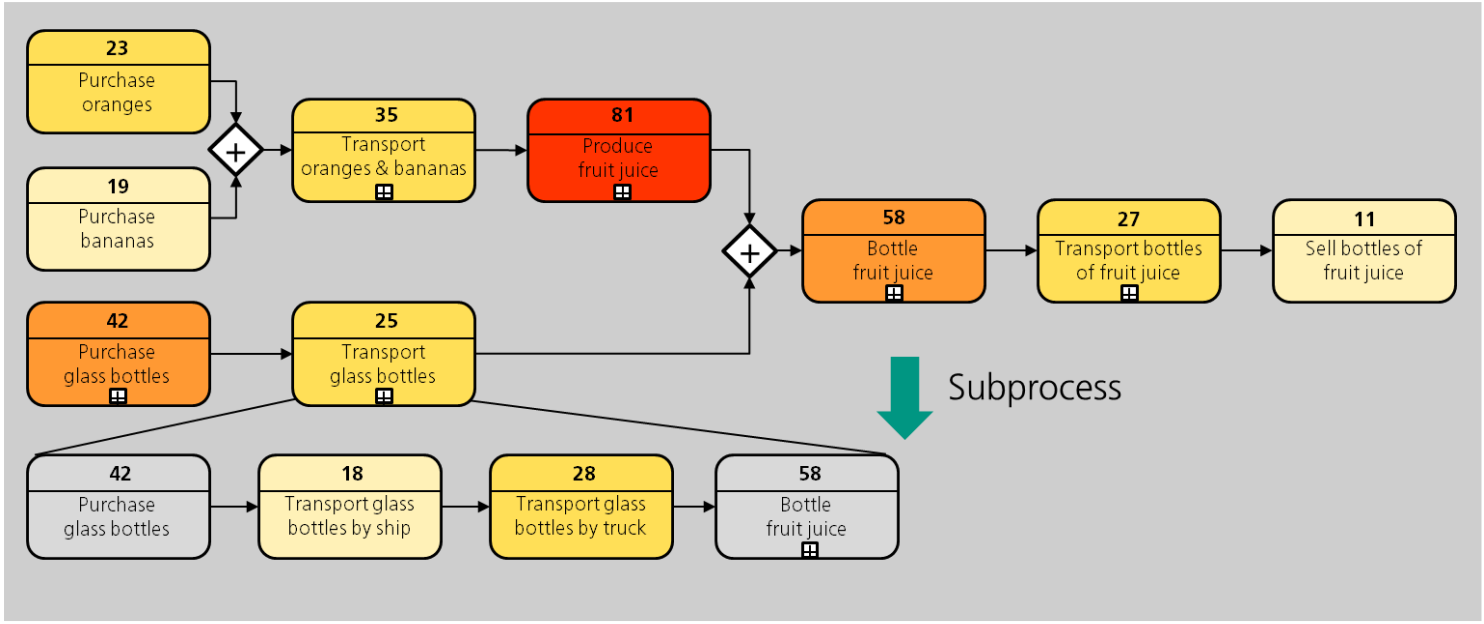
O3: Scope Display



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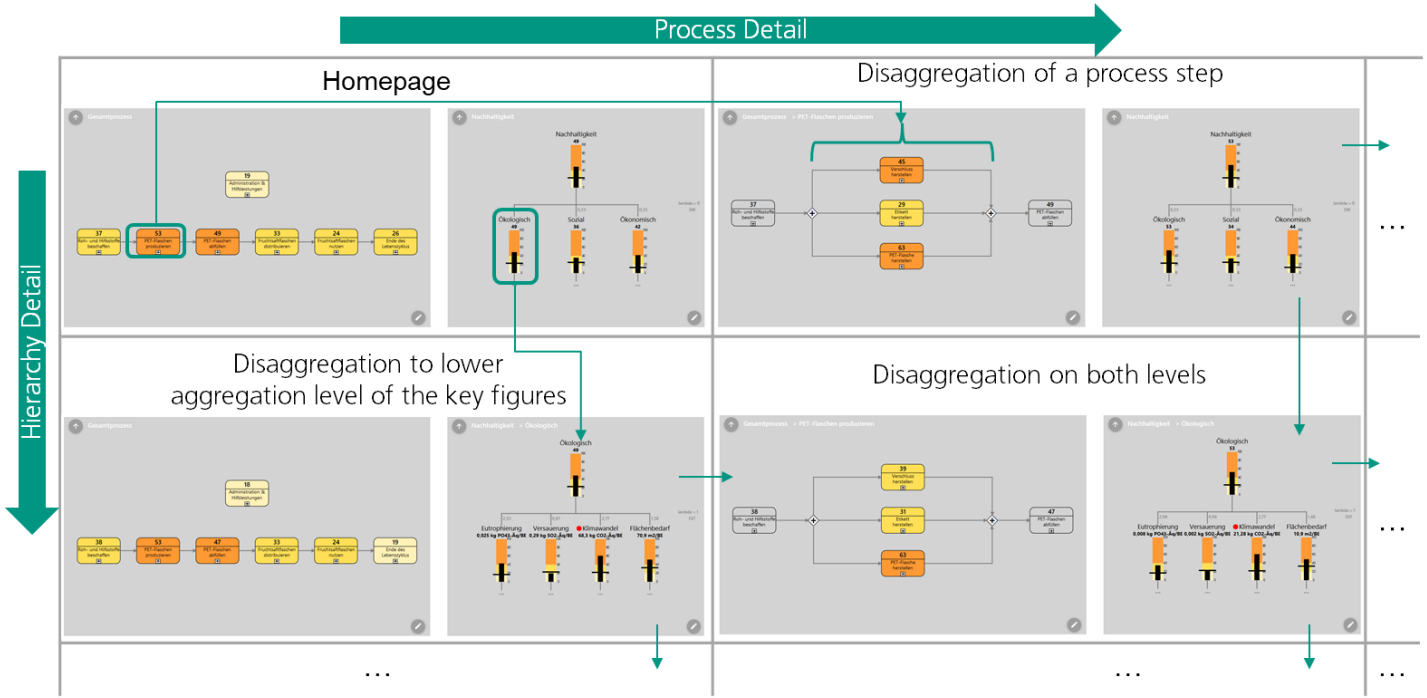
D1-D4: Tactical Design Elements



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Usability Evaluation

What worked:

- Clarification of comprehensive sustainability approach by presenting the indicator hierarchy
- Coloring intuitively understood.
- Weighting of indicators and composition of aggregation indicators correctly interpreted.
- Variation of detail level was seen as very useful.

What did not:

- Visualizations tend to be overloaded.
- Connection between both graphs not always clear.
- Drill-down functionality appeared to be complicated.
- Some users had initial problems to read the bullet graphs.

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Discussion

Contribution

- Combined drill-down functionality for processes and indicators supports communication of life cycle information.
- Adaptation of BPMN notation to effectively visualize sustainability aspects.

Limitations

- Aggregation of impact categories is controversial in LCA literature.
- Links and dependencies between sustainability dimensions are neglected in aggregation scheme.
- While an arbitrary number of indicators can be integrated, the effort to actually collect the data and perform the assessment remains.
- Initial “proof of concept” implementation in software prototype.

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Thank you!

Link to paper:

- https://www.aifb.kit.edu/images/6/67/O_LCA_Dashboard_preprint.pdf

Get in contact:

- https://www.aifb.kit.edu/web/Andreas_Fritsch

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Related Designs

Table 2: Classification of related designs by dashboard characteristics.

Literature	Environmental	Economic	Social	Multiple	Organizational Perspective	Life Cycle Approach
Bash et al. (2011) [2]	X	X	X	X		(X)
Fegraus et al. (2012) [7]	X		X	X		
Hunt et al. (2014) [19]	X	X	X	X	(X)	
Lozano (2006) [31]	X	X	X	X	(X)	
Meul et al. (2008) [36]	X	X	X	X	(X)	
Pa et al. (2017) [42]	X			(X)		
Traverso et al. (2012) [50]	X	X	X	X		X
Yun et al. (2014) [61]	X					

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